DPN-833/8233/8333 SERIES

MICRO PRINTER

USER'S MANUAL

The contents of this manual are subject to change without notice.

DPN-833/8233/8333 SERIES

MICRO PRINTER

USER'S MANUAL

(May 1999)

NOTICE FOR THE PRINTER USED IN EUROPE

The cable of the interface (parallel port or serial port) for printers must be prepared by the user and must be met the following specifications:

1. Use the shielded cable for the connection to the printer.
2. Use the noise filter on the cable and the cable should be turned as shown in following Figure.

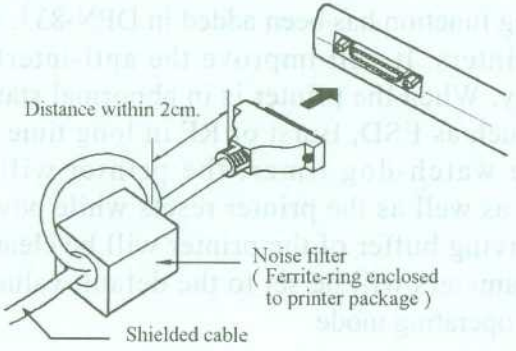

Figure: The noise filter is required for the connection to the parallel port or serial port.

The Notice For Watch-Dog Function in DPN-833/8233/8333 Printer

The Watch-Dog function has been added in DPN-833, DPN-8233 and DPN-8333 printers. It will improve the anti-interference of the printers greatly. When the printer is in abnormal state due to some interference such as ESD, Burst or RF in long time exceeding the period of the watch-dog timer, the printer will be restarted automatically as well as the printer resets while power on. At this point the receiving buffer of the printer will be cleared and all the command parameters will be set to the default values. The printer entries normal operating mode.

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Warning !

The power supply of DPN-833/8233/8333 series printer is only DC +5V.

Never use AC mains !

Introduction

DPN-833/8233/8333 is a new series of fast speed, general purpose impact dot matrix microprinter. All members of this series are small in size , light in weight , attractive in appearance and easy in operation.

The special features of this series are fast speed and high reliability. This is the advantages of new hardware and software design. An 8-pin shuttle impact print head is adopted. Also Fast Paper Feed Function - twice the speed of printing - is added.

A font of 448 characters in the internal ROM includes IBM* Character Set # 2, also Greek, German, French, Russian, Japanese and Chinese characters, math symbols, specific meaning symbols and tabulation symbols. Forty print commands include Graph, Table, Curve. Most of these are compatible with the ESC/P standard.

DPN-833, 8233 & 8333 come in three types with different numbers of characters per line (24,40 or 42 characters / line) and two interfaces (parallel , compatible with CENTRONICS , and serial compatible with RS –232C .)

DPN-833/8233/8333 printers are competent as the output listing devices for many kinds of intelligent instrument and microcomputer . DPN-8333 series is designed especially for those applications which need fast speed and small size , such as Point - Of- Sale System , Electronic Cash register and automatic recorder.

* Registered trademark of IBM.

Chapter 1. Features and Specifications

1.1 Features

Impact dot matrix printing .Can print two paper. (only for DPN-8233/8333 series)

4,6,or8-pin shuttle type print head. Compact size.

Different types with 24 , 40 or 42 characters /line .

Fast printing speed-2.5 , 1.9 or 1.5 lines / sec respectively , and Fast paper feed speed-twice of printing speed.(only for DPN-8333 series) . Use plain paper roll, internal.

40 printing commands, compatible with ESC/P standard.

Besides Characters in ROM, user can define up to 32 user-defined characters of 6 x 8 dot matrix.

Two control keys for On/Off line control and Paper Feed.

Two LED indicators for Power On and On/Off line.

Self-Test function.

CMOS devices are adopted. Lower power consumption and better interference resistance.

Power-down and Wake-up automatically. Minimize power comsumption when printer is not in the printing status.

1.2 Nomenclature

Model numbers are given according to the following system.

DPN - 8□□□ - □□ - □□□

Mechanism Model:	Line Width:	Interface:
33- M-160 series	24,40,42	PAR- Parallel
233- M-180 series	Characters	V.24- Serial
333- M-190 series		

1.3. Specifications

Print Characters :

448 defined characters in ROM, includes IBM* Character Set # 2.

32 user definable characters

Character Compositions :

Standard Characters -	5X7 dot matrix
Block graphic characters -	6X8 dot matrix
User definable characters -	6X8 dot matrix

Line Spacing : 1 - 255 dot line

Interface: Parallel (CENTRONICS compatible)
Serial (RS-232C compatible)

* Registered trademark of IBM

Connector: 25 pin D-type (male) for Parallel
25 hole D-type (female) for Serial

Signal Level: TTL for Parallel
EIA for Serial

DIP Switch: for Serial Interface only, internal

Baud Rate - 19200, 9600, 4800, 2400, 1200, 600, 300, 150

Parity Check - Even, Odd (8 bit only), and None

Hand Shake - Flag Control or XON/XOFF protocol

Data Length - Seven or eight data bits, one stop bit

Paper: Plain Paper Roll, Width - 57.5+/-0.5mm
Inner Diameter - >10mm
Outer Diameter - 50mm for internal roll

Input Buffer: 0.5K bytes or 6.5K bytes (Optional)

Copy: 1 original + 1 noncarbon duplicate

Ribbon : ERC-22 (purple , 1 million characters)
ERC-22 only for DPN-8233 and DPN-8333

Power : DC 5V +/-0.5V
Power-do
wn - current 45 mA
Wake-up - current 55 mA
Printing - Mean current 2.5A
Peak current 5A

Power Connector: DC Jack type, on the back of printer, central pin diameter 2.35mm. DC Plug outer diameter 5.5mm, inner hole diameter 2.5mm.

Dimension : 165mm (w) x 141mm (D) x 65mm (H)
Weight: 350 grams ,without paper roll

Operating Environment:
Temperature - 0 °C to +40 °C
Humidity - 5 to 80% RH

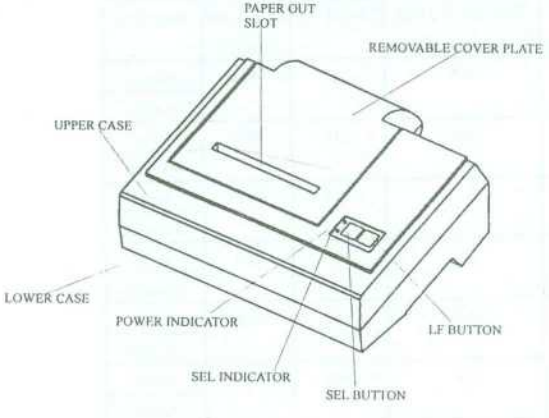
Main Parameters of DPN-833/8233/8333 Microprinters

MODEL	Char./Line (5x7)	Char.Size mm(WxH)	Speed (lines/sec.)	Fast Paper Feed Speed (lines/sec.)	Dots/Line	Life Time (kilo line)	Interface
DPN-833-24-V.24	24	1.7x2.4	0.7	0.7	144	500	Serial
DPN-833-24-PAR							Parallel
DPN-833-40-V.24	40	1.1x2.4	0.4	0.4	240	400	Serial
DPN-833-40-PAR							Parallel
DPN-8233-24-V.24	24	1.7x2.6	1.7	1.7	144	1000	Serial
DPN-8233-24-PAR							Parallel
DPN-8233-42-V.24	42	1.1x2.6	1.0	1.0	252	700	Serial
DPN-8233-42-PAR							Parallel
DPN-8333-24-V.24	24	1.7x2.6	2.5	6.0	144	1500	Serial
DPN-8333-24-PAR							Parallel
DPN-8333-40-V.24	40	1.1x2.6	1.5	3.6	140	900	Serial
DPN-8333-40-PAR							Parallel

Chapter 2. Installation

2.1 Model Checking

The appearance of DPN-833/8233/8333 series printer is shown in Figure 2-1 . Check the model number on the label of the printer. Read all instructions about this model in the manual .



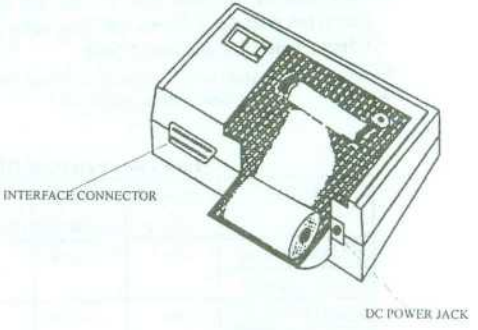


Figure2-1. Appearance of DPN-833/8233/8333 series printer

2.2 Accessories Examination

.A paper roll and a ribbon cassette have been loaded inside the printer before packing. A user's manual is included. The user may select optional accessories according to their needs (see Appendix F).

2.3 Install Ribbon Cassette

Ribbon cassette has been put inside the printer before packing When the printing becomes faint after long use , put in a new ribbon cassette . The removable cover plate must be removed while inserting a new ribbon cassette . Following pictures show how to remove it .

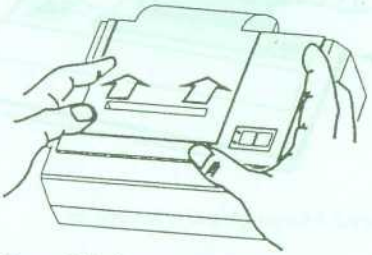


Figure 2-2. Correct action.

1. Push forward the removable Cover Plate with both thumbs. (Note the arrow on Cover Plate. See Figure 2-2 and Figure 2-3.) Then take off Cover Plate carefully.

Figure 2-3. Incorrect action - wrong direction.

2. Hold the left end of the ribbon cassette with your left hand. Hold right end in right hand. Right thumb is on top and forefinger below (Figure 2-4). Lift the right end of the cassette with the right forefinger. Then lift the left end. The ribbon cassette will come off easily. Caution - Never lift left end first. This may damage ribbon and printer head.

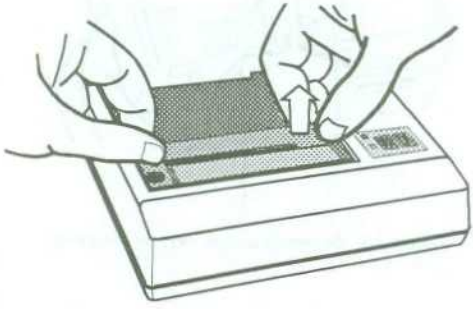


Figure 2-4 Ribbon Cassette - Unloading

3. Take a new ribbon. Hold the cassette as in step 2. Put the left end on the axle of the gear on the left end of the printer head. Keep the right end of the cassette up as shown in Figure 2-5.

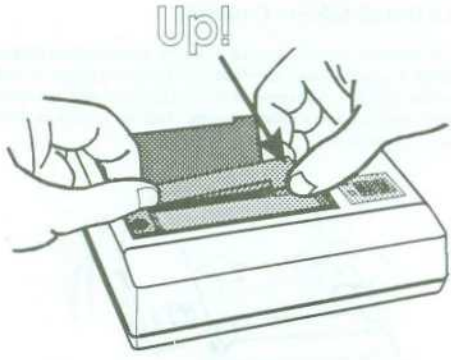


Figure 2-5 Keep right end of cassette up

If it is difficult to push the left end down, raise it again. Hold the cassette with right hand. Press the gear on the cassette with left thumb. Then rotate slightly as indicated. See arrow on the cassette cover (Figure 2-6).

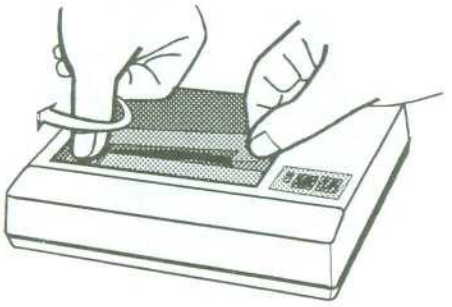


Figure 2-6 Turn the gear as indicated by the arrow

Secure the cassette on the printer head. The procedure may be repeated several times until it is easy to push the left end of the cassette onto the axle of the gear. Then press down the right end of the cassette with the right thumb as shown in Figure 2-7.

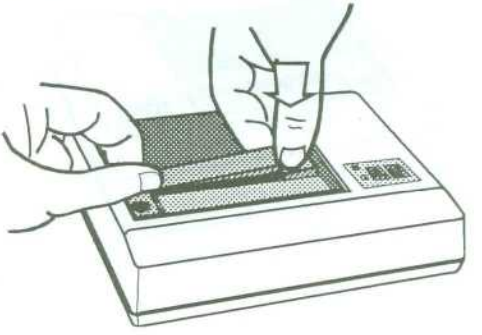


Figure 2-7 Press down the right end with thumb

Sometimes, the cassette is put in correctly but part of the ribbon rides up over the printer head as shown in Figure 2-8.

Figure 2-8 Part of the ribbon rides up over the printer head

This may be caused by two reasons. 1. The paper has been loaded before the ribbon. Remove paper and try again. 2. The ribbon has been used for long time. Replace with new cassette.

4. Put on the removable Cover Plate.

Place the Plate on the Guide Slot. Push into place gently as in Figure 2-9.

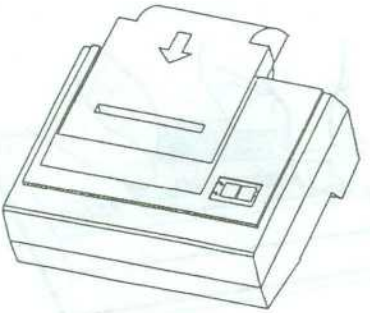


Figure 2-9. Put on Cover Plate

2.4 Loading Paper

There are two ways to store the paper Roll : Place the Paper Roll inside of the printer case , as ex-factory ; Load paper as follows:

1. The removable Cover Plate must be taken off.
2. Cut the paper roll as shown in Figure 2-10.

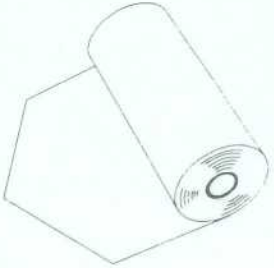


Figure 2-10. Cut the paper roll

The paper roll may be placed inside the printer case . When The paper roll is placed inside , the end should be underneath as Figure 2-11 . caution – Don't load as Figure 2-12 .

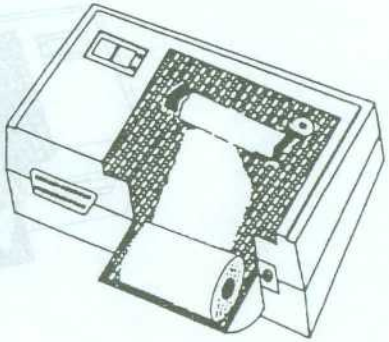


Figure 2-11 Correct paper roll loading - End is underneath

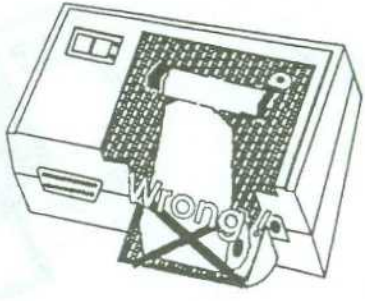


Figure 2-12 Wrong paper roll loading

3. Power on 5V power supply.

4. The SEL (select) Button is an ON/OFF toggle . press to "OFF", the SEL indicator off . Then press LF (Line Feed) button , the printer head begins to run . Feed in paper . The paper enters the printer head and comes out from the top of the printer head . To stop paper feeding release LF button .

5. Then press and release LF or SEL. Or switch off the power supply.

6. Feed the paper through the slot on the removable Cover Plate. Then push the plate back on the printer as before. (See Section 2.3 Step 4.)

2.5 Power Supply

The DPN-833/8233/8333 series printer uses a 5V DC power supply . A power supply is specially made for this series and is recommended in Appendix F. Insert the output plug of the power supply into the jack on the back of the printer . When using other models of power supply, please pay attention to the voltage and current limits .If the voltage is higher than DC5.5V or lower than DC 4.5V, or the maximum current is less than 5A,the printer will not work normally ,and the printer head may be damaged .

Pay attention to the polarity of the power supply. The central pin of the power jack on the printer is positive. The spring plate in the side of the jack is negative. See Figure 2-14.

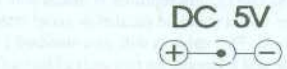


Figure 2-14 Polarity of the Power Jack

The whole system may be linked as in Figure 2-15.

Caution: Never connect AC mains directly!

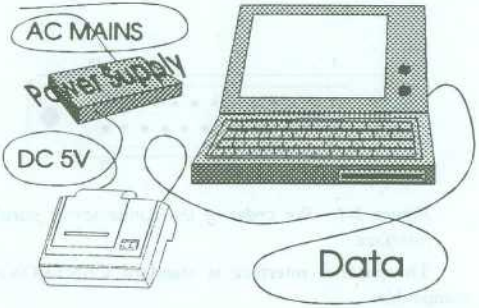


Figure 2-15 Whole system connection

Chapter 3. Operation

3.1 Parallel Interface Connection

When a DPN-833/8233/8333 microprinter is linked with a PC, laptop,or other equipment with a standard parallel or serial interface, a standard cable can be used. This cable is with two standard 25 pin D type connectors, a male and a female, on two ends of this cable, and with 25 wire connection .Other computers and equipment could also be connected by making a special cable .The 25pin connector of parallel interface on the back of the DPN-833/8233/8333 series printer is shown in Figure 3-1.

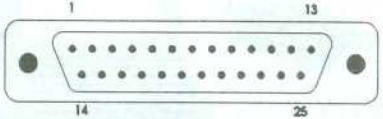


Figure 3-1. Pin order of the connector of parallel interface

The parallel interface is standard CENTRONICS compatible.

The descriptions of signals are listed in Figure 3-2.

Pin No.	Signal	In/Out	Description
1	$\overline{STB}$	IN	Strobe pulse to read data in
2	DATA1	IN	These signals represent information of the 1st to 8th bits of parallel data respectively. Each signal is at "HIGH" level when data is logical "1" and "LOW" when logical "0"
3	DATA2	IN	
4	DATA3	IN	
5	DATA4	IN	
6	DATA5	IN	
7	DATA6	IN	
8	DATA7	IN	
9	DATA8	IN	
10	$\overline{ACK}$	OUT	Acknowledge pulse, "LOW" indicates thet data has been received and thet the printer is ready to accept next data.
11	BUSY	OUT	Signal set "HIGH" to indicate the printer cannot accept data.
12	PE	------	Pull-down to ground
13	SEL	OUT	Pull-up to +5V through 3.3k resister, to indicate the printer in ON-LINE.
15	$\overline{ERROR}$	OUT	Pull-up to +5V through 3.3k resistor.
14,16,17	NC	------	No connection
18-25	GND	------	Ground, Logical "0" level.

Figure 3-2. The descriptions of parallel interface signals

Signal level is TTL standard.

The signal timing chart of parallel interface is shown in Figure 3-3.

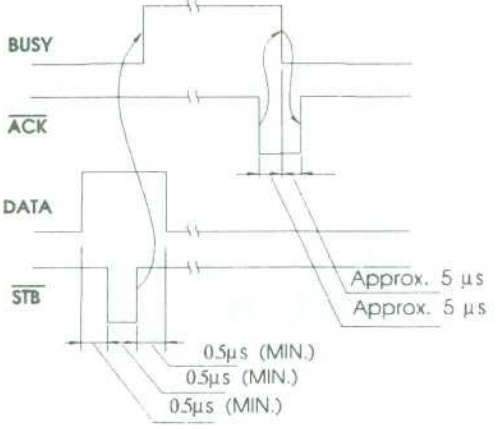


Figure 3-3. Signal timing chart of parallel interface

3.2 Serial Interface Connection

The cable mentioned in Section 3.1 also can be used to link printer with computers or equipment with standard RS-232C interface.

The 25 hole connector on the back of the DPN-833/8233/8333 series printer is shown in Figure 3-4

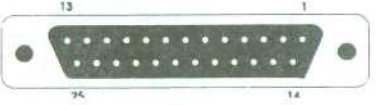


Figure 3-4. Hole order of the connector of serial interface

The serial interface is standard RS-232C compatible. The descriptions of signals are listed in Figure 3-5.

Pin No.	Signal	Source	Description
2	TxD	Host	Printer receives data from host computer
3	RxD	Printer	Printer trasmits data when uses the handshaking of X-ON/X-OFF
5	CTS	Printer	Signal sets "MARK" state to indicate the printer is BUSY and can not accept data, and "SPACE" state to indicate the printer is ready and can accept data.
6	DSR	Printer	Signal sets "SPACE" to indicate the printer is ON-LINE
7	GND		Signal Ground
8	DCD	Printer	Same as CTS

Figure 3-5. The descriptions of serial interface signals

Signal level is compatible with EIA standard.

The Baud Rate of serial interface can be selected as 150, 300, 600, 1200, 2400, 4800, 9600 or 19200 bps. It can be set with internal DIP switches as required. To set the Baud Rate, take off the removable Cover Plate and the upper case of the printer. You can see the DIP switch in the upper right corner of the PCB. Baud Rate can be selected as in Figure 3-7. Switch near the white mark is K1. The setting is K1 ON, K2 OFF, K3 OFF ex-factory, i.e. 9600 bps. (See Figure 3-6.)

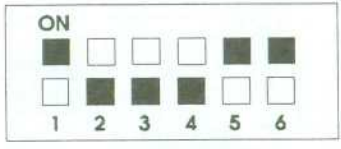


Figure 3-6. DIP switch ex-factory setting

DIP SWITCH	BPS
	150
	300
	600
	1200
	2400
	4800
	9600
	19200

Figure 3-7 Baud Rate selection

The format of serial interface is asynchronous as shown in Figure 3-8.

Start Bit (0)	Data Bits	Parity Bit	Stop Bit (1)
1 bit	7/8 bits	1 bit	1 bit

Figure 3-8. Asynchronous transmitting format

START bit and STOP bit are one bit signals. These signals come at the beginning and end of a computer message. The computer message, the DATA, has seven or eight bits, plus a Parity Check bit. The Data bits and Parity Check can be set with K5/K6 switches as in Figure 3-9. These are set at 8 bits/Non Parity ex-factory, K5 ON, K6 ON.

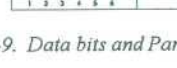
DIP SWITCH	PARITY
	8-NON
	8-ODD
	8-EVEN
	7-EVEN

Figure 3-9. Data bits and Parity selection

The signal polarity of serial RS-232C is:

Mark = Logic "1" (EIA low level, -3V to -27V)

Space = Logic "0" (EIA high level, +3V to +27V)

There are two kinds of Handshaking to be selected. First is the Flag Control. The other is the X-ON/X-OFF protocol. It is selected with K4 as in Figure 3-10. The K4 is set to OFF ex-factory.

DIP SWITCH	HANDSHAKING
	FLAG
	XON/XOFF

Figure 3-10. Handshaking selection

Two kinds of Handshaking are listed in Figure 3-11.

Handshaking	Data Direction	RS-232 Interface's Signal
Flag Control	Can accept data	Line 5 & 8 are SPACE state
	Can't accept data	Line 5 & 8 are MARK state
X-ON/X-OFF Control	Can accept data	Send X-ON code (11H) on line 3
	Can't accept data	Send X-OFF code (13H) on line 3

Figure 3-11. Two kinds of Handshaking

The operation procedure of serial interface is shown as follows:

(1) Select Baud Rate with switches K1 - K3.

(2) Select Data bits and Parity with switches K5 - K7.

(3) Select Handshaking with switch K4.

(4) When only 32 bytes free space is left in the printer buffer, signal DCD (line 8) and CTS (line 5) are both set to "busy", i.e. Mark status, by printer. Otherwise set to "ready", i.e. Space status.

(5) Under X-ON/X-OFF control Handshaking, the printer sends X-OFF code (13 in Hex.) when it is busy, sends X-ON code (11 in Hex.) when ready.

(6) Under Flag control Handshaking, host computer sends data to printer when both DCD and CTS are ready.

3.3 Indicators and Switches Operation

There are two indicators and two button switches on the panel of the printer. The power indicator is labelled "P.". The other is the "SEL" indicator. A button switch is labelled "SEL" for selecting On/Off Line. Another is labelled "LF" for paper Line Feeding. (See Figure 3-12.)

Figure 3-12. Indicators and switches

On/Off-Line status is indicated by the green SEL LED. When the indicator is On the printer is On-Line. The SEL button changes this status.

Three working mode - Self-Test, On/Off Line and Paper Feed are selected by SEL and LF buttons.

1. Self-Test Mode

There are two ways to enter the Self-Test mode.

(1) When Power On Press SEL button for a few seconds, then release. The SEL indicator then turns off and the printer prints out Self-Test sample.

(2) With Power On and printer Off-Line, press and hold LF and then press SEL. Release both buttons together. The printer will enter Self Test mode

There are also two ways to exit the Self-Test mode.

(1) The printer will exit Self-Test mode automatically after printing the Self-Test sample.

(2) When the Self-Test sample is being printed, it can be terminated by pressing the SEL button.

2. On/Off Line Mode

After switching on or exiting from the Self-Test mode, the printer enters On-Line mode. The SEL indicator lights up. Press the SEL button, SEL indicator goes off. Printer enters Off-Line mode and can not receive data. Press SEL again. Printer re-enters the On-Line mode.

SEL has another function - to interrupt the printout. If SEL is pressed and then released during a printout, the printer will stop after completing the current line. At this point you can feed more paper. To complete the printout, press and release SEL button. The printer will run again at the point printout was interrupted.

3. Paper Feed Mode

When print procedure is interrupted, SEL off, the printer enters Off-Line mode.If paper has to be replaced ,press LF button .Printer will feed paper without printing ,then release LF, printer will stop paper feed. Press SEL, printer re-enters On –Line mode.

3.4 Self-Test

Self- Test checks condition of printer. If the printer prints out the Self-Test sample correctly It is working normally. Eventually faults are not caused by the printer but by the interface on host computer.If Self- Test does not run or print out a faulty sample , check power supply . If power is OK , the printer itself requires attention.

Self-Test prints out all characters in the fonts. Then prints the messages about interface type and printer head model .

After Self-Test the printer enters On-Line mode. It can then Receive data from the host computer.

3.5 Printer Initialization

Initialization includes default value settings. Default values are: 3 dot line spacing, 40 lines Form length, 0 values of vertical tab and horizontal tab, 0 values of right margin and left margin, normal alphanumeric and graphic character size (i.e. enlarge factor is 1). Initialization clears all user defined characters and data in printing buffer, and selects character set 1, then sets printer to On-Line mode, i.e. ready to receive commands and data.

There are three ways to realize Initialization.

First - run Initialization software on master computer. Master computer sends Initialization command (ESC @) to printer.

Second - through Self-Test procedure.

Third - power on Initialization.

Chapter 4. Printing Commands

4.1 Summary

DPN-833/8233/8333 provides up to 40 printing commands . These command special functions :

(1) Define formatting.
(2) Enlarge or condense of characters.
(3) Print image graphics.
(4) Select font.
(5) Define special characters.
(6) Other.

Some of these commands consist of a one byte control code. Some are ESC code sequences. The latter sequences start with "ESC" code, followed by other alphanumeric characters.

Printer's control codes (especially ESC control codes) are not standardized .Every printer manufacturer has his own code system . Control codes for the DPN-833/8233/8333 series were designed with reference to the popular printer .Hence ,they are compatible with most printers .

Printing commands are described under five headings set out below:

Code Sequence
Function
Format
Explanation
Example

Code Sequence Function

Format: ASCII : the sequence in standard ASCII characters
Decimal : the sequence in decimal numbers.
Hexadecimal: the sequence in hexadecimal numbers.

Explanation:

A description of the effect of issuing the command, i.e. what the command does.

Example:

Some program examples are listed to illustrate the commands.

These printing commands are introduced below according to the type of function they perform.

4.2 Paper Feeding Commands

LF — Line Feed

Format: ASCII : LF
Decimal : 10
Hexadecimal: 0A

Explanation:

Feed one line forward.

ESC J — Perform Dot-Line Feed

Format: ASCII : ESC J n
Decimal : 27 74 n
Hexadecimal: 1B 4A n

Explanation:

Immediate Line Feed for n dot lines without Carriage Return. The value of n can be any number in the range 1 - 255.

Enlarge character commands ESC V or ESC W (refer to Section 4.4) enlarge line spacing and consequently change the value of any following ESC J command.

ESC 1 — Set line spacing

Format: ASCII : ESC 1 n
Decimal : 27 49 n
Hexadecimal: 1B 31 n

Explanation:

The line spacing is set to n dot-lines for future Line Feed commands.

The value of n can be any number in the range 1 - 255. Normal settings are n=0 for ESC K Bit Image printing mode and n=3 for text printing mode.

Example:

The BASIC program for this command is shown below:

```
10 FOR I=1 TO 11 STEP 2
20 LPRINT CHR$(27);"1";CHR$(I);
                        'ESC 1,  set line spacing
```

```
30 LPRINT "LINE SPACING";CHR$(10);
                        'print string and Line Feed
40 NEXT I
```

A printout of above program on DPN-8333-24:

```
LINE SPACING
LINE SPACING
LINE SPACING
LINE SPACING
LINE SPACING

LINE SPACING
```

FF — Form feed

Format: ASCII :	FF		
Decimal :	12		
Hexadecimal:	0C		

Explanation:

Feed paper to the beginning position of next page.

4.3 Formatting Commands

ESC C — Set page length in lines

Format: ASCII :	ESC	C	n
Decimal :	27	67	n
Hexadecimal:	1B	43	n

Explanation:

The page length is set to n lines. The value of n should be within the range 0 to 255. If n=0, the page length will be 256 line. Default value n=40.

ESC N — Set bottom margin

Format: ASCII :	ESC	N	n
Decimal :	27	78	n
Hexadecimal:	1B	4E	n

Explanation:

The bottom margin is set to n lines . The value of n should be within the range 0 to 255.Default value n=0.In DPN-8333, the bottom margin is the spacing between the last line of a page and the first line of the next page.

a page and the first line of the next page.

Example:

To set the bottom margin to 3 lines, send the following sequence:

ASCII :	ESC	N	ETX
Decimal :	27	78	3
Hexadecimal :	1B	4E	03

BASIC program:

```
LPRINT CHR$(27);"N";CHR$(3);
```

ESC O — Cancel bottom margin

Format: ASCII :	ESC	O	
Decimal :	27	79	
Hexadecimal :	1B	4F	

Explanation:

The bottom margin is set to zero. This means the printer will print line by line without page breaks.

ESC B — Set vertical tabs

Format: ASCII :	ESC	B	n_1	n_2	n_3	...	NUL
Decimal :	27	66	n_1	n_2	n_3	...	0
Hexadecimal :	1B	42	n_1	n_2	n_3	...	00

Explanation:

The tab positions are entered as n_1, n_2, and so on. These n_1, n_2, ... are within the page length set by ESC C command.

The NUL character is added to indicate the end of the command.

All vertical tab settings can be cleared by using this command in the format ESC B NUL.

VT command executes vertical tab, and feeds paper to next tab position.

Example:

To set three vertical tabs at lines 2, 5 and 8 on a page, you would send the following commands:

ASCII :	ESC	B	STX	ENQ	BS	NUL
Decimal :	27	66	2	5	8	0
Hexadecimal :	1B	42	02	05	08	00

BASIC program:

```
10 LPRINT
CHR$(27);"B";CHR$(2)CHR$(5)CHR$(8)CHR$(0);
                    'ESC B commands
20 LPRINT CHR$(11);          'VT command
30 LPRINT "VTAB1";           'print string
40 LPRINT CHR$(11);          'VT command
50 LPRINT "VTAB2";           'print string
60 LPRINT CHR$(11);          'VT command
70 LPRINT "VTAB3";           'print string
```

Printout:

VTAB1

VTAB2

VTAB3

VT — Vertical tab

Format: ASCII : VT
Decimal : 11
Hexadecimal : 0B

Explanation:

Feed paper to next vertical tab set by ESC B command.

Note: If no vertical tab setting or if current position equals or exceeds the last vertical tab, command VT feeds paper one line (same as LF command).

ESC D — Set horizontal tabs

Format:	ASCII :	ESC	D	n_1	n_2 ...	NUL
	Decimal :	27	68	n_1	n_2 ...	0
	Hexadecimal:	1B	44	n_1	n_2 ...	00

Explanation:

The tab positions are entered as n_1, n_2 and so on. These n_1, n_2, ... are within the line width of the printer. (See 1.3).

The NUL character is added to indicate the end of the command.

All horizontal tab settings can be cleared by using this command in the format ESC D NUL.

HT command executes horizontal tab.

Example:

To set three horizontal tabs at character positions 2, 9 and 14, you would send the following commands:

ASCII :	ESC	D	STX	HT	SO	NUL
Decimal :	27	68	2	9	14	0
Hexadecimal:	1B	44	02	09	0E	00

The BASIC program for this example is set out below:

```
10 LPRINT "123456789012345678901234" 'scalar
20 LPRINT
CHR$(27);"D";CHR$(2)CHR$(9)CHR$(14)CHR$(0);
                                'ESC D
30 LPRINT CHR$(9);              'HT command
40 LPRINT "HT1";                'print string
50 LPRINT CHR$(9);              'HT command
60 LPRINT "HT2";                'print string
70 LPRINT CHR$(9);              'HT command
80 LPRINT "HT3"                 'print string
```

The printout from this program on DPN-8333-24 is :

```
123456789012345678901234
 HT1      HT2   HT3
```

HT — Horizontal tab

Format: ASCII : HT
Decimal : 9
Hexadecimal : 09

Explanation:

The printing position is advanced to the next horizontal tab set by ESC D command.

If no Horizontal Tab setting or if the current print position equals or exceeds the last Horizontal Tab, HT command does not execute.

ESC f — Print blank characters or lines

Format: ASCII :	ESC	f	m	n
Decimal :	27	102	m	n
Hexadecimal:	1B	66	m	n

Explanation:

If m=0, command ESC f NUL n will print n blank characters. The value n should be within the line width of the printer (See Section 1.3).

If m=1, command ESC f SOH n will print n blank lines. The value n should be within the range 0 to 255.

Example:

To print 6 space characters in the line, send the following command:

ASCII :	ESC	f	NUL	ACK
Decimal :	27	102	0	6
Hexadecimal:	1B	66	00	06

To print 6 blank lines:

ASCII :	ESC	f	SOH	ACK
Decimal :	27	102	1	6
Hexadecimal :	1B	66	01	06

ESC Q Set right margin

Format: ASCII : ESC Q n
Decimal : 27 81 n
Hexadecimal : 1B 51 n

Explanation:

The value n should be within the line width of the printer (See Section 1.3).

Default value n=0. No right margin.

The command sets an absolute position and is not affected by character enlarge command ESC U or ESC W.

When the right margin is reached, a Carriage Return and Line Feed is added.

Example:

To set the right margin to 6 columns, send:

ASCII :	ESC	Q	ACK
Decimal :	27	81	6
Hexadecimal :	1B	51	06

The BASIC program for this example is set out below:

```
10 LPRINT "12345678901234567890123" 'scale
20 LPRINT CHR$(27);"Q";CHR$(6);      'ESC Q
30 LPRINT "123456789012345678901234567890"
```

Printout on DPN-8333-24 :

```
123456789012345678901234
123456789012345678
901234567890
```

ESC l Set left margin

Format: ASCII : ESC l n
Decimal : 27 108 n
Hexadecimal : 1B 6C n

Explanation:

The value n should be within the line width of the printer (See Section 1.3). Default value n=0. This means no left margin.

The command sets an absolute position and is not affected by character enlarge command ESC U or ESC W.

Example:

To set the left margin to 6, you would send:

ASCII : ESC l ACK
Decimal : 27 108 6
Hexadecimal : 1B 6C 06

BASIC program:

```
10 LPRINT "123456789012345678901234"  'scale
20 LPRINT CHR$(27);"l";CHR$(6);       'ESC l
30 LPRINT "12345678901234567890123456789O"
```

Printout on DPN-8333-24 :

```
123456789012345678901234
  1234567890123456 78
  901234567890
```

4.4 Character Setting Commands

ESC U Enlarge width

Format: ASCII : ESC U n
Decimal : 27 85 n
Hexadecimal : 1B 55 n

Explanation:

Characters or graphics following this command are printed at n times normal width. The value n should be in the range 1 to 4. Default value n=1, i.e. normal width.

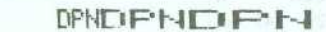
Example:

BASIC program:

```
10 FOR I=1 TO 3      'from 1 to 3 times
20 LPRINT CHR$(27);"U";CHR$(I);
                     'ESC U command
30 LPRINT "DPN";  'print string
```

```
40 NEXT I
50 LPRINT CHR$(13);        'CR command
```

Printout:



Note: ESC U will not function unless preceded by ESC W SOH (n=1, see ESC W in this section), i.e. Set height and width to normal size before enlarging width ESC U.

ESC V — Enlarge height

Format: ASCII :	ESC	V	n
Decimal :	27	86	n
Hexadecimal :	1B	56	n

Explanation:

Characters or graphics following this command are printed at n times normal height. The value n should be within the range 1 to 4. Default value n=1, i.e. normal height.

This command can only be set at the beginning of a line.

Example:

BASIC program:

```
10 FOR I=1 TO 3      'from 1 to 3 times
20 LPRINT CHR$(27);"V";CHR$(I);
                     'ESC V command
30 LPRINT "DPN"      'print string
40 NEXT I
```

Printout on DPN-8333-24 :

Note: ESC V will not function unless preceded by ESC W SOH (n=1, see ESC W in this section), i.e. Set height and width to normal size before enlarging height ESC V.

ESC W — Enlarge width & height

Format: ASCII : ESC W n
Decimal : 27 87 n
Hexadecimal : 1B 57 n

Explanation:

Characters or graphics following this command are printed at n times normal width and height. The value n should be in the range 1 to 4. Default value n=1, i.e. normal width and height.

Example:

BASIC program:

```
10 FOR I=1 TO 3     'from 1 to 3 times
20 LPRINT CHR$(27);"W";CHR$(I);
                    'ESC W command
30 LPRINT "DPN"     'print string
40 NEXT I
```

Printout:

ESC - — Turn underline on/off

Format: ASCII : ESC - n
Decimal : 27 45 n
Hexadecimal : 1B 2D n

Explanation:

Underlining is turned on if n = 1 and turned off if n = 0. All characters are underscored including spaces.

Example:

BASIC program:

```
10 LPRINT "DPN";
20 LPRINT CHR$(27);"-";CHR$(1);
                        'turn on underline
30 LPRINT "-PRINTER-";  'print string
40 LPRINT CHR$(27),"-";CHR$(0);
                        'turn off underline
50 LPRINT "DPN"
```

Printout:

ESC +

Turn overscore on/off

Format: ASCII : ESC + n
Decimal : 27 43 n
Hexadecimal: 1B 2B n

Explanation:

Overscoring is turned on if n=1 and turned off if n=0. All characters are overscored including spaces.

Example:

BASIC program:

```
10 LPRINT "DPN";
20 LPRINT CHR$(27);"+";CHR$(1);
                        'turn on overscore
30 LPRINT "-PRINTER-";  'print string
40 LPRINT CHR$(27),"+";CHR$(0);
                        'turn off overscore
50 LPRINT "DPN"
```

Printout:

DPN-PRINTER-DPN

ESC 6

Select Font 1

Format: ASCII : ESC 6
decimal : 27 54
Hexadecimal: 1B 36

Explanation:

Characters following this command are printed using the Font 1 (See Appendix B).

There are two fonts available in the DPN-833/8233/8333 printer. Font 1 is selected at power on or on ESC @ command.

ESC 7

Select Font 2

Format: ASCII : ESC 7
decimal : 27 55
Hexadecimal: 1B 37

Explanation:

Characters following this command are printed using the Font 2 (See Appendix B).

Also see ESC 6.

SO Select double-width printing for one line

Format: ASCII : SO
decimal : 14
Hexadecimal: 0E

Explanation.

Characters following this command on the same line ir the print buffer are printed at twice their normal width. The command is cancelled by a Carriage Return or using DC4 (see next command).

Normal and enlarged characters can be mixed on the same line, using SO-on ... DC4-off.

DC4 Cancel double-width

Format: ASCII : DC4
Decimal : 20
Hexadecimal: 14

Explanation:

Double-width printing is cancelled if it has been set using SO. This command does not cancel enlarge width printing selected using ESC U or ESC W.

ESC i Turn reverse printing on/off

Format: ASCII : ESC i n
Decimal : 27 105 n
Hexadecimal: 1B 69 n

Explanation:

Reverse printing is turned on if n=1 and turned off if n=0. Reverse printing is white on black, as in a photographic negative.

Normal printing is black characters on a white background and is selected at power on or on ESC @ command.

Example:

BASIC program:

```
10 LPRINT CHR$(27);"i";CHR$(1);
                              'turn on reverse printing
20 LPRINT " ABCDEFGHIJKLMNO"
```

Printout:

ESC c	Turn inverse printing on/off

Format: ASCII :	ESC	c	n
Decimal :	27	99	n
Hexadecimal :	1B	63	n

Explanation:

Inverse printing (UP SIDE DOWN) is turned On if n=1 ,Off if n=0 .Inverse printing is usual in wall-mounted printer. ESC c does not support the inverse printing of Graphics.

Default Value n=0, is selected at power on or on ESC @.

4.5 User-Defined Characters Commands

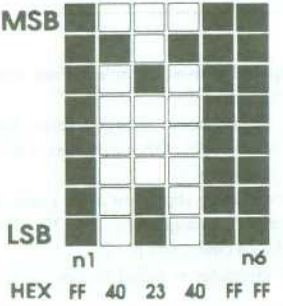
ESC &	Define user-defined characters

Format: ASCII :	ESC	&	m	n_1 $n_2 \ldots n_6$
Decimal :	27	38	m	n_1 $n_2 \ldots n_6$
Hexadecimal:	1B	26	m	n_1 $n_2 \ldots n_6$

Explanation:

This command allows a character to be defined. The value m is the code of this user-defined character, and ranges from 32 to 255.

The values n_1, n_2, ..., n_6 are codes for structure defined characters. Character size is 6 x 8 dot matrix. The relation of the structure and codes n_1, n_2, ..., n_6 is shown below:



User-defined characters are stored in printer RAM until power off.

If many ESC & commands use same m value, only the last one is effective. The maximum number of user-defined characters is 32.

Also see ESC % and ESC : commands.

ESC % Replace with user-defined characters

Format: ASCII : ESC % m_1 n_1 m_2 n_2 ... m_k n_k NUL
Decimal : 27 37 m_1 n_1 m_2 n_2 ... m_k n_k 0
Hexadecimal : 1B 25 m_1 n_1 m_2 n_2 ... m_k n_k 00

Explanation:

This command is used to replace Font characters with user-defined characters.

m_1, m_2, ..., m_k are codes of user-defined characters.

n_1, n_2, ..., n_k are codes of the characters in the current font - the replaced characters.

The values m and n should be in the range 32 to 255.

The subscript $_k$ ranges from 1 to 32. The maximum number of replaced characters is 32.

The NUL character is added to indicate the end of the command.

Also see ESC & and ESC : command.

ESC : Reinstate the Font characters

Format: ASCII : ESC :
Decimal : 27 58
Hexadecimal : 1B 3A

Explanation:

This command reinstates the original characters in the font replaced by user-defined characters using ESC % command. User-defined characters, however, are not deleted from the RAM in printer and may be brought back again with ESC %.

Example:

The BASIC program for showing ESC &, ESC % and ESC : commands is listed below:

```
10 LPRINT CHR$(27);"W";CHR$(2);
                        'enlarge in W & H
20 LPRINT CHR$(27);"&";CHR$(65);
                        'ESC & command
30 LPRINT
       CHR$(&HFF);CHR$(&H40);CHR$(&H23);
```

```
40 LPRINT
   CHR$(&H40);CHR$(&HFF);CHR$(&HFF);
50 LPRINT
   CHR$(27);"%";CHR$(65);CHR$(65);CHR$(0);
                              'ESC %
60 LPRINT CHR$(65)          'print defined character
70 LPRINT CHR$(13);
80 LPRINT CHR$(27);":";     'ESC : command
90 LPRINT CHR$(65)          'reinstate char. in Font 1
```

Printout on DPN-8333-24 :

4.6 Printing Graphics Commands

ESC K — Bit Image printing

Format: ASCII :	ESC	K	n_1	n_2 ... data ..
Decimal :	27	75	n_1	n_2 ... data ...
Hexadecimal :	1B	4B	n_1	n_2 ... data ...

Explanation:

The value n_1 and n_2 form a 16-bit number W with n_1 as the low byte and n_2 as the high byte. This number W represents the width of a graphic. W should be in the range 1 to the maximum number of dots per line.

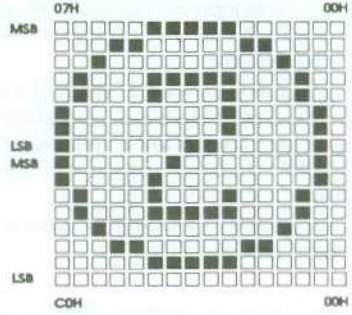
This command prints graphics with W X 8 dot matrix. The width of such graphics is W dots, and the height is 8 dots. Each column has 8 dots and can be represented by a byte (8 bits). The MSB of the byte corresponds to the uppermost dot of the column. "1" black "0" white.

The data are the bytes of relative columns in the graphics. The number of bytes should equal W.

Example:

To print the special graphics shown below, ESC K command is used. This example is 16 x 16 dot matrix (16 columns and 16 rows), and should be divided into two parts (upper & lower) for printing. The line spacing should be set 0 by using the command ESC 1 n. So n_1=16 and n_2=0 , that is W=16, for each 8 rows. There are all together 32 bytes of data. The data in hexadecimal are:

07, 18, 20, 40, 40, 98, 90, 91, 91, 9E, 40, 40, 20, 18, 07, 00,
C0, 30, 08, 04, 04, 72, 92, 12, 12, 32, 04, 04, 08, 30, C0, 00.



BASIC program :

```
10 FOR E=1 TO 2
20 RESTORE 120
30 LPRINT CHR$(27);"W";CHR$(E);
                    'enlarge in W & H
40 LPRINT CHR$(27);"1";CHR$(0);
                    'line spacing = 0
50 FOR J=1 TO 2
60 LPRINT CHR$(27);"K";CHR$(16);CHR$(0);
                    'ESC K command
70 FOR I=1 TO 16
80 READ D: LPRINT CHR$(D);
                    'enter 16 bytes of data
90 NEXT I: LPRINT 'enter CR
100 NEXT J: LPRINT: LPRINT
110 NEXT E: END
120 DATA  &H07, &H18, &H20, &H40
130 DATA  &H40, &H98, &H90, &H91
140 DATA  &H91, &H9E, &H40, &H40
150 DATA  &H20, &H18, &H07, &H00
160 DATA  &HC0, &H30, &H08, &H04
170 DATA  &H04, &H72, &H92, &H12
180 DATA  &H12, &H32, &H04, &H04
190 DATA  &H08, &H30, &HC0, &H00
```

Printout on DPN-8333-24 :

ESC ‘							Print curving graph lines
Format: ASCII :	ESC ‘	m	n_1	n_2 ...		n_k	CR
Decimal :	27	39 m	n_1	n_2 ...		n_k	13
Hexadecimal :	1B	27 m	n_1	n_2 ...		n_k	0D

Explanation:

This command is designed to print curving graph lines along the paper feed (vertically). The value m is the number of lines and should be within the range 1 to the maximum number of the dots per line (See Section 1.3).

In a horizontal dot line, there are m intersections of m curving graph lines. The value n_1, n_2, ... , n_k represent the position of these m intersections. The number of n_k must equal m. Each n_k must fall within the number of dots per line. The last CR (Carriage Return) lets printer print one dot line. As all horizontal lines are printed out with respective n_k values, m curves will appear in the printout.

Example:

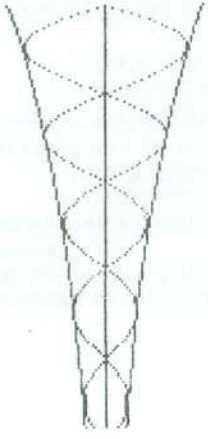
To print out graph lines of the five equations:

```
Y1=50+40*EXP(-0.01*X)*SIN(X/10)
Y2=50-40*EXP(-0.01*X)*SIN(X/10)
Y3=50
Y4=50+40*EXP(-0.01*X)
Y5=50-40*EXP(-0.01*X)
```

Program with BASIC language as below:

```
10 FOR X=0 TO 150 'print 150 dot lines
20 Y=INT(40*EXP(-0.01*X))
30 YY=INT(Y*SIN(X/10))
40 LPRINT CHR$(27)CHR$(39)CHR$(5);
                        'ESC ' command m=5
50 LPRINT CHR$(50+YY)CHR$(50-YY)CHR$(50);
60 LPRINT CHR$(50+Y)CHR$(50-Y)CHR$(13);
70 NEXT X
```

Printout on DPN-8333-24 :



4.7 Initialization Command

ESC @ — Initialize printer

Format: ASCII : ESC @
Decimal : 27 64
Hexadecimal : 1B 40

Explanation:

Reset printer to:

* clear print buffer
* restore default values
* select Font 1
* de-select user-defined characters

4.8 Data Control Commands

CR — Carriage Return

Format: ASCII : CR
Decimal : 13
Hexadecimal : 0D

Explanation:

When a Carriage Return is sent to the printer, any data in the buffer is printed and paper is fed one line.

CAN Cancel line

Format: ASCII : CAN
Decimal : 24
Hexadecimal : 18

Explanation:

This command cancels all text in the print buffer preceding this code back to the previous Carriage Return. It does not cancel any control code sequences issued in that line.

DEL Delete character

Format: ASCII : DEL
Decimal : 127
Hexadecimal : 7F

Explanation:

The previous character in the buffer is deleted unless that character has already been printed. This command will not remove control codes.

NUL Null

Format: ASCII : NUL
Decimal : 0
Hexadecimal : 00

Explanation:

NUL is used as the final code in some commands such as ESC B, ESC D, ESC % and ESC '.

NUL command is ignored by printer when used alone.

4.9 Hexadecimal Dump Printing Command

ESC "	Turn Hexadecimal Dump printing on/off

Format: ASCII : ESC " n
Decimal : 27 34 n
Hexadecimal : 1B 22 n

Explanation:

Hexadecimal Dump print mode is turned on if n=1, and turned off if n=0. If you execute programs or list program in Hexadecimal Dump print mode, all data sent from the host computer will be printed out in hexadecimal.

Example:

When the following 4 data are sent from the host computer after the command ESC ".

```
10 LPRINT CHR$(27);CHR$(34);CHR$(1);
20 LPRINT CHR$(0);CHR$(27);"A";CHR$(24);
```

The printout reads:

```
00 1B 41 18
```

Printing in the Hexadecimal Dump mode is performed only when the printer is in the line buffer-full state.

Chapter 5. Printing Examples

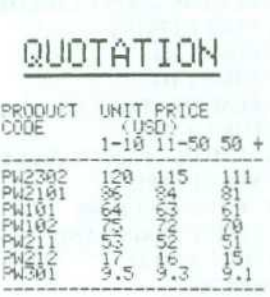
Example Programs below illustrate BASIC programs written for the DPN-8333 printer with different interfaces.

5.1 Parallel Port Printer

Example 1. DPN-8333 –24-PAR printer is connected with the parallel port of PC . BASIC Program for printing a quoatation :

```
10 'Print example for PARALLEL port printer
20 WIDTH "LPT1:",255
30 ESC$=CHR$(27): TAB$=CHR$(9)
40 LPRINT
ESC$;"D";CHR$(10)CHR$(15)CHR$(21)CHR$(0);
50 LPRINT ESC$;"W";CHR$(2);
60 LPRINT "  ";ESC$;"-";CHR$(1);
70 LPRINT "QUOTATION";ESC$;"-";CHR$(0)
80 LPRINT ESC$;"W";CHR$(1);
90 LPRINT "  "
100 LPRINT "PRODUCT    UNIT  PRICE"
110 LPRINT  "CODE              (USD) "
120 READ D$: LPRINT D$;
130 FOR J=1 TO 3
140 READ D$: LPRINT TAB$;D$;
150 NEXT J: LPRINT
160 GOSUB 240
170 FOR I=1 TO 7
180 READ D$: LPRINT D$;
190 FOR J=1 TO 3
200 READ D$: LPRINT TAB$;D$;
210 NEXT J: LPRINT
220 NEXT I: GOSUB 240
230 LPRINT: LPRINT: END
240 FOR I=1 TO 24
250 LPRINT "-";
260 NEXT I: LPRINT
270 RETURN
280 DATA "  ","1-10","11-50","50 +"
290 DATA "PW2302","120","115","111"
300 DATA "PW2101","86","84","81"
310 DATA "PW101","64","63","61"
320 DATA "PW102","75","72","70"
330 DATA "PW211","53","52","51"
340 DATA "PW212","17","16","15"
350 DATA "PW301","9.5","9.3","9.1"
```

Printout:



QUOTATION

PRODUCT CODE	UNIT PRICE (USD)		
	1-10	11-50	50 +
PW2302	120	115	111
PW2101	86	84	81
PW101	64	63	51
PW102	75	72	70
PW211	55	53	51
PW212	17	16	15
PW301	9.5	9.3	9.1

5.2 Serial-Port Printer

Example 2. DPN-8333-24-V.24 printer is connected with the RS -232 C serial port of PC. The Flag Control is selected by setting K4 to ON. Also 9600 baud rate , 8-bit data and Non- Parity are selected . (See Section 3.2.) BASIC Program for printing the same quotation as in Example 1 :

```
10 'Print example for SERIAL port printer
12 'FLAG control
14 OPEN "COM1:9600,N,8,1,CS,DS,CD10000" AS #1
20 WIDTH "COM1:",255
30 ESC$=CHR$(27): TAB$=CHR$(9)
40 PRINT
#1,ESC$;"D";CHR$(10)CHR$(15)CHR$(21)CHR$(0);
50 PRINT #1,ESC$;"W";CHR$(2);
60 PRINT #1," ";ESC$;"-";CHR$(1);
70 PRINT #1,"QUOTATION";ESC$;"-";CHR$(0)
80 PRINT #1,ESC$;"W";CHR$(1);
90 PRINT #1," "
100 PRINT #1 "PRODUCT   UNIT FRICE"
110 PRINT #1 "CODE            (USD) "
120 READ D$: PRINT #1,D$;
130 FOR J=1 TO 3
140 READ D$: PRINT #1,TAB$;D$;
150 NEXT J: PRINT #1,CHR$(13);
160 GOSUB 240
170 FOR I=1 TO 7
180 READ D$: PRINT #1,D$;
190 FOR J=1 TO 3
200 READ D$: PRINT #1,TAB$;D$;
210 NEXT J: PRINT #1,CHR$(13);
220 NEXT I: GOSUB 240
230 PRINT #1,CHR$(13);: PRINT #1,CHR$(13);: END
240 FOR I=1 TO 24
250 PRINT #1,"-";
260 NEXT I: PRINT #1,CHR$(13);
```

```
270 RETURN
280 DATA " ","1-10","11-50","50 +"
290 DATA "PW2302","120","115","111"
300 DATA "PW2101","86","84","81"
310 DATA "PW101","64","63","61"
320 DATA "PW102","75","72","70"
330 DATA "PW211","53","52","51"
340 DATA "PW212","17","16","15"
350 DATA "PW301","9.5","9.3","9.1"
```

The printout of this program is same as Example 1.

Example 3. DPN-8333-24-V.24 printer is connected with the RS-232C serial port on P C. The XON / XOFF protocol is selected by setting K4 to OFF (see DIP switch setting in section 3.2). The other parameters are same as the example above . BASIC program for testing XON / XOFF function :

```
10 'Test XON/XOFF program
15 OPEN"COM1:9600,N,8,1,CS0,DS0,CD0" AS #1
20 WIDTH "COM1:",255
30 ON COM(1) GOSUB 130
40 COM(1) ON: XON=&H11: XOFF=&H13
45 X$=CHR$(XON)
50 FOR J=1 TO 5
60 IF X$=CHR$(XOFF) THEN 60
70 PRINT #1,CHR$(13);CHR$(J);".";
80 FOR I=32 TO 255
90 PRINT #1,CHR$(I);
100 IF X$=CHR$(XOFF) THEN 100
110 NEXT I
120 NEXT J: END
130 X$=INPUT$(1,#1)
140 RETURN
```

Run program. The printer prints 5 blocks of ASCII character set. The contents of these 5 blocks must be the same. If not, XON/XOFF function of the printer is wrong. The DIP switch setting must then be re-checked.

Chapter 6. Operating Note

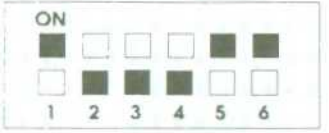
1. Do not dismantle printer head.
2. Do not leave power on when not in use for a long period.
3. Switch off if printer works abnormally.
4. Power supply must match requirement. See Section 2.5.
5. Do not lubricate the printer head.
6. Fluff and dust from paper are harmful to printer head. Check and clear the head when replacing paper roll.
7. When replacing ribbon, do not press the cassette too heavily. Otherwise the plastic wheel on the head may be damaged.
8. Keep the main circuit board clean.
9. Do not remove the IC chips in the main board.
10. Never use ribbon oil. It may damage printer head.
11. Do not tear the paper when the printer is printing or feeding paper.

Appendix A. DIP Switch

There is a seven-section DIP switch inside the case near the connector. This is used to set the parameters of the serial port of DPN-833/8233/8333 - □ -V.24. Three switches of the DIP switch are used to set the Baud Rate. One sets Handshaking. The remaining two switches set 8 bits or 7 bits each character as well as Parity check.

The DIP switch was set ex-factory as:

Ex-factory Switch Setting :



i.e. Baud Rate 9600 bps, Handshaking X-ON/X-OFF protocol, character 8 bits, and Parity Check Non-Parity.

DIP switch settings:

Baud Rate Setting

DIP SWITCH	BPS
	150
	300
	600
	1200
	2400
	4800
	9600
	19200

Parity Setting

DIP SWITCH	PARITY
	8-NON
	8-ODD
	8-EVEN
	7-EVEN

Handshaking Setting

DIP SWITCH	HANDSHAKING
	FLAG
	XON/XOFF

Appendix B. Character Code Tables

There are two character code tables or sets in the printer. Code Range from 20H (Hexadecimal) to FFH (Hexadecimal). Code 00H to 1FH are control codes (See Appendix C.). ESC 6 command is used to select Font 1 (Character code table 1), and ESC 7 to select Font 2 (Character code table 2).

Font 1:

Font 2:

Appendix C. Printing Command Codes

Decimal	Hex.	Symbol Format	Function	Page
0	00	NUL	Ending signal	37
9	09	HT	Horizontal tab	24
10	0A	LF	Line Fee	20
11	0B	VT	Vertical tab	23
12	0C	FF	Form Feed	21
13	0D	CR	Carriage Return	36
14	0E	SO	Double-width print	30
20	14	DC4	Cancel SO command	30
24	18	CAN	Delete line	37
27 34	1B 22	ESC " n	Hexadecimal Dump print	38
27 37	1B 25	ESC % m_1 n_1 ... NUL	Replace with user-defined characters	32
27 38	1B 26	ESC & m n_1 ... n_6	Define user-defined character	31
27 39	1B 27	ESC ' m n_1 ... n_k CR	Print curving graph lines	35
27 43	1B 2B	ESC + n	Overscope	29
27 45	1B 2D	ESC - n	Underline	28
27 49	1B 31	ESC 1 n	Set line spacing	20
27 54	1B 36	ESC 6	Select Font 1	29
27 55	1B 37	ESC 7	Select Font 2	29
27 58	1B 3A	ESC :	Reinstate character in ROM	32

Appendix C. Printing Command Codes - Continued

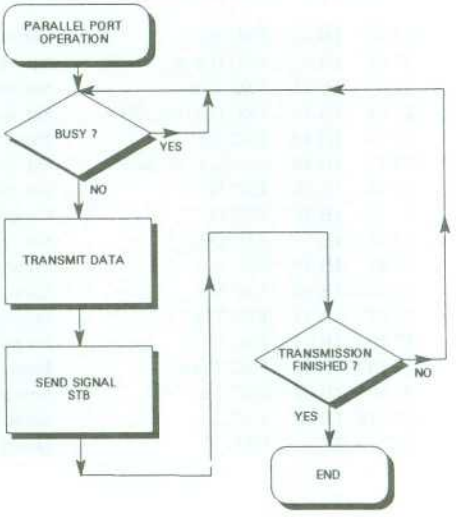
Decimal	Hex.	Symbol Format	Function	Page
27 64	1B 40	ESC @	Initialize printer	36
27 66	1B 42	ESC B n_1 n_2 ... NUL	Set vertical tabs	22
27 67	1B 43	ESC C n	Set page length	21
27 68	1B 44	ESC D n_1 n_2 ... NUL	Set horizontal tabs	23
27 74	1B 4A	ESC J n	Paper Feed	20
27 75	1B 4B	ESC K n_1 n_2 .data.	Bit Image printing	33
27 78	1B 4E	ESC N n	Set bottom margin	21
27 79	1B 4F	ESC O	Cancel bottom margin	22
27 81	1B 51	ESC Q n	Set right margin	25
27 85	1B 55	ESC U n	Enlarge in width	26
27 86	1B 56	ESC V n	Enlarge in height	27
27 87	1B 57	ESC W n	Enlarge in width & height	28
27 99	1B 63	ESC c n	Inverse printing	31
27 102	1B 66	ESC f m n	Print blank character or blank line	24
27 105	1B 69	ESC i n	Reverse printing (white in black)	30
27 108	1B 6C	ESC l n	Set left margin	26
127	7F	DEL	Delete last character	37

Appendix D. Parallel Interface and Operation

1. Parallel Interface Signals

Pin No.	Signal	In/Out	Description
1	$\overline{STB}$	IN	Strobe pulse to read data in
2	DATA1	IN	These signals represent information of the 1st to 8th bits of parallel data respectively. Each signal is at "HIGH" level when data is logical "1" and "LOW" when logical "0"
3	DATA2	IN	
4	DATA3	IN	
5	DATA4	IN	
6	DATA5	IN	
7	DATA6	IN	
8	DATA7	IN	
9	DATA8	IN	
10	$\overline{ACK}$	OUT	Acknowledge pulse, "LOW" indicates that data has been received and that the printer is ready to accept next data.
11	BUSY	OUT	Signal set "HIGH" to indicate the printer cannot accept data.
12	PE	-----	A "HIGH" signal indicates that the printer is out of paper.
13	SEL	OUT	Pull-up to +5V through 3.3k resistor, to indicate the printer in ON-LINE.
15	$\overline{ERROR}$	OUT	Pull-up to +5V through 3.3k resistor.
14,16,17	NC	------	No connection
18-25	GND	------	Ground, Logical "0" level.

2. Parallel Interface Operation

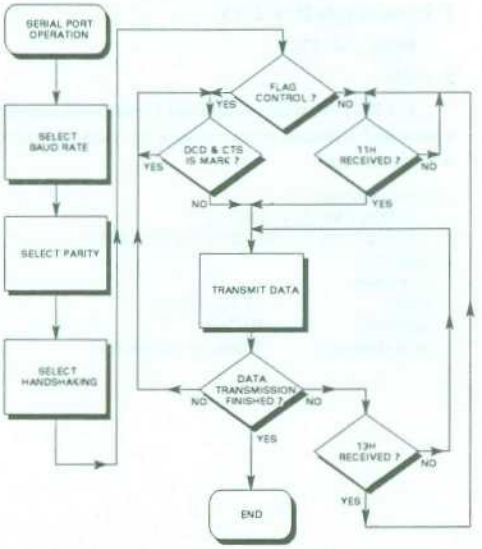


Appendix E. Serial Interface and Operation

1. Serial Interface Signals

Pin No.	Signal	Source	Description
2	TxD	Host	Printer receives data from host computer
3	RxD	Printer	Printer trasmits data when uses the handshaking of X-ON/X-OFF
5	CTS	Printer	Signal sets "MARK" state to indicate the printer is BUSY and can not accept data, and "SPACE" state to indicate the printer is ready and can accept data.
6	DSR	Printer	Signal sets "SPACE" to indicate the printer is ON-LINE
7	GND		Signal Ground
8	DCD	Printer	Same as CTS

2. Serial Interface Operation



Appendix F. Option List

1. Power Supply DSV-2333

   Input - AC 230V

2. Cable

   For IBM PC, with two standard 25 pin D type connectors, a male and a female, on two ends of this cable, and with 25 wire connection.

3. Ribbon cassettle
   EPSON ERC-22 or ERC-09
   (ERC-22 only for DPN-8233 and DPN-8333)

4. Paper Roll
   Plain paper

Width-	57.5+/-0.5mm
Thickness-	0.07mm
Outer diameter-	50mm for internal roll

Appendix G Printer Outline

unit: mm